

(TRANSLATION)
 PATENT COOPERATION TREATY
 PCT
 INTERNATIONAL SEARCH REPORT
 (PCT Article 18 and Rules 43 and 44)

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| Applicant's or agent's file reference W0793-00 | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA220) as well as, what applicable, item 5 below. | |
| International application No. PCT/JP02/13453 | International Filing date (day/month/year) 24/12/02 | (Earliest) Priority Date (day/month/year) 27/12/01 |
| Applicant: HITACHI CHEMICAL COMPANY, LTD. | | |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless other wise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (See Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. 1A

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/13453

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ H01M8/02, 8/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl⁷ H01M8/02, 8/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

| | | | |
|---------------------------|-----------|----------------------------|-----------|
| Jitsuyo Shinan Koho | 1926-1996 | Toroku Jitsuyo Shinan Koho | 1994-2003 |
| Kokai Jitsuyo Shinan Koho | 1971-2003 | Jitsuyo Shinan Toroku Koho | 1996-2003 |

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| X Y | JP 2000-100453 A (Hitachi Chemical Co., Ltd.), 07 April, 2000 (07.04.00), Full text (Family: none) | 1-15 10-11 |
| X Y | JP 2000-82476 A (Hitachi Chemical Co., Ltd.), 21 March, 2000 (21.03.00), Full text (Family: none) | 1-7, 9-15 10-11 |
| X | JP 10-125337 A (Nippon Carbon Co., Ltd.), 15 May, 1998 (15.05.98), Full text (Family: none) | 1-7, 9-10, 12-15 |

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

| | |
|---|--|
| * Special categories of cited documents: | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "E" earlier document but published on or after the international filing date | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family |
| "O" document referring to an oral disclosure, use, exhibition or other means | |
| "P" document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search
25 March, 2003 (25.03.03)

Date of mailing of the international search report
08 April, 2003 (08.04.03)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/13453

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|---------------------------|
| X Y | JP 2000-182630 A (Nisshinbo Industries, Inc.), 30 June, 2000 (30.06.00), Full text & EP 1011164 A2 & US 2002/0068210 A1 | 1-7, 9-10, 12-15 11 |
| X Y | JP 2001-189159 A (Nisshinbo Industries, Inc.), 10 July, 2001 (10.07.01), Full text & EP 1094534 A2 | 1-7, 9, 12-15 10-11 |
| X Y | JP 2001-106831 A (Sumitomo Bakelite Co., Ltd.), 17 April, 2001 (17.04.01), Full text (Family: none) | 1-7, 9, 12-15 10-11 |
| X | JP 8-222241 A (Tokai Carbon Co., Ltd.), 30 August, 1996 (30.08.96), Full text (Family: none) | 6-7, 9, 12-15 |
| P, X | JP 2002-184420 A (Mitsubishi Chemical Corp.), 28 June, 2002 (28.06.02), Full text (Family: none) | 1-7, 9-10, 12-15 |
| X Y | JP 2000-348740 A (Ibiden Co., Ltd.), 15 December, 2000 (15.12.00), Full text (Family: none) | 8-9, 12-15 10-11 |
| P, X | JP 2002-198063 A (Mitsubishi Chemical Corp.), 12 July, 2002 (12.07.02), Claims; Par. No. [0007] (Family: none) | 8-9, 12-15 |

INTERNATIONAL SEARCH REPORT

International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

(See extra sheet)

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☒ No protest accompanied the payment of additional search fees.

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International application No.

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Continuation of Box No.II of continuation of first sheet(1)

Whereas for a group of inventions to fulfill the requirement of unity of invention, there must exist special technical features for linking the group of inventions so as to form a single general inventive concept, it is clear that in the inventions in claims 1-15 no common special technical features exist between a fuel cell separator excellent in the assembling integrity of a fuel cell stack constituting claims 1-7, 9-15 and a fuel cell separator that is not likely to deteriorate cell characteristics after an extended time of operation constituting claim 8.

Therefore, there exists among a group of inventions in claims 1-15 no special technical features for linking the group of inventions so as to form a single general inventive concept. Accordingly, it is clear that the group of inventions in claims 1-15 do not fulfill the requirement of unity of invention.

Next, the number of inventions, that is, the number of inventions described in the claims of this international application and liked so as to form a general inventive concept will be studied.

Although claims 1-3, 7, 9-15, claims 4-5 and claim 6 are linked in terms of a fuel cell separator excellent in the assembling integrity of a fuel cell stack, their technical features are mutually different ones, that is, bending breaking strain, compressive modulus of elasticity and Shore hardness within specified ranges. In addition, since this matter is disclosed in prior-art documents, such as

Document 1: JP 8-222241 A (Tokai Carbon Co., Ltd.) 1996.08.30, Table 2, Comparison example 3,

it cannot constitute a special technical feature, and claims 1-3, 7, 9-15, claims 4-5 and claim 6 are considered to be different inventions.

Accordingly, the claims in this international application describe four inventions classified as claims 1-3, 7, 9-15, claims 4-5, claim 6 and claim 8.